

# **Exhibit “X”**

# Associated Earth Sciences, Inc.



*Serving the Pacific Northwest Since 1981*

April 5, 2012

Project No. KE090291B

Mr. Buff Nelson  
P.O. Box 461  
Redmond, Washington 98073

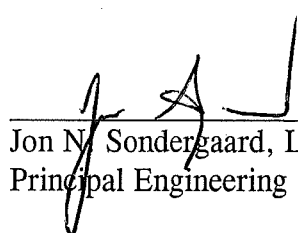
Subject: Critical Areas Report  
(Geotechnical Aspects)  
Gunshy Manor  
20005 NE Union Hill Road  
Redmond, Washington

Dear Mr. Nelson:

Associated Earth Sciences, Inc. (AESI) is pleased to present the enclosed copies of the above-referenced Critical Areas Report. This Critical Areas Report summarizes our geotechnically related critical area findings for the proposed project.

We have enjoyed working with you on this study. If you should have any questions or if we can be of additional help to you, please do not hesitate to call.

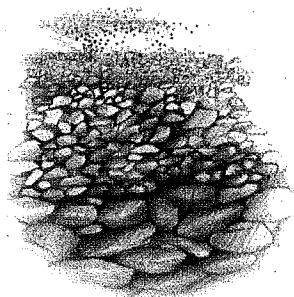
Sincerely,  
**ASSOCIATED EARTH SCIENCES, INC.**  
Kirkland, Washington



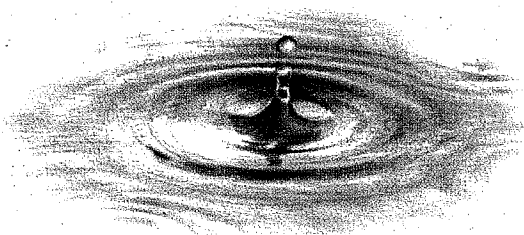
Jon N. Sondergaard, L.G., L.E.G.  
Principal Engineering Geologist

JNS/lid  
KE090291B4  
Projects\20090291\KE\WP

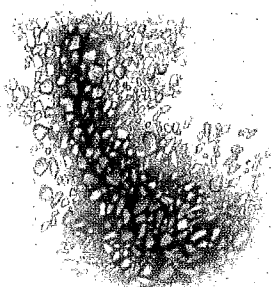
Kirkland    ▪    Everett    ▪    Tacoma  
425-827-7701    425-259-0522    253-722-2992 **ESTATE 00266**  
[www.aesgeo.com](http://www.aesgeo.com)



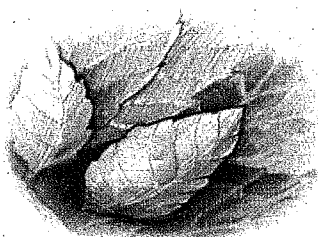
*Geotechnical Engineering*



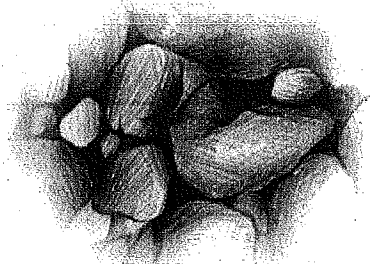
*Water Resources*



*Environmental Assessments  
and Remediation*



*Sustainable Development Services*



*Geologic Assessments*

## **Associated Earth Sciences, Inc.**

*Serving the Pacific Northwest Since 1981*

Critical Areas Report  
(Geotechnical Aspects)

### **GUNSHY MANOR**

Redmond, Washington

Prepared for

**Mr. Buff Nelson**

Project No. KE090291B  
April 5, 2012

**CRITICAL AREAS REPORT  
(GEOTECHNICAL ASPECTS)**

**GUNSHY MANOR**

**Redmond, Washington**

*Prepared for:*

**Mr. Buff Nelson**

P.O. Box 461

Redmond, Washington 98073

*Prepared by:*

**Associated Earth Sciences, Inc.**

911 5<sup>th</sup> Avenue, Suite 100

Kirkland, Washington 98033

425-827-7701

Fax: 425-827-5424

April 5, 2012

Project No. KE090291B

## **INTRODUCTION**

This Critical Areas Report pertains to the proposed boundary line adjustment for proposed single-family residential building lots at the subject site. The Gunshy Manor property consists of approximately 124 acres of land within the Evans Creek drainage and is located south of NE Union Hill Road and west of 208<sup>th</sup> Drive NE in King County near Redmond, Washington. We understand that the current plan is to create, through a boundary line adjustment, five large lots as shown on Figure 1. Lots 1 and 4 have previously been built out and are not part of this report. Within Lots 2, 3, and 5, developable residential building sites have been identified as shown on Figure 2. These building sites are located at the base of slopes located on the east side of the Evans Creek drainage.

## **PURPOSE AND SCOPE**

The purpose of this study was to fulfill the critical areas report requirements per Chapter 21A.24 of the *King County Code* (KCC).

## **WRITTEN AUTHORIZATION**

Written authorization to proceed with this Critical Areas Report was granted by Mr. Buff Nelson, in general accordance with our proposal letter dated March 6, 2012. This Critical Areas Report has been prepared for the exclusive use of Mr. Buff Nelson, the Estate of Barbara J. Nelson, and their agents for specific application to this project. Within the limitations of scope, schedule, and budget, our services have been performed in accordance with generally accepted engineering geology practices in effect in this area at the time our report was prepared. No other warranty, express or implied, is made.

It must be understood that no recommendations or engineering design can yield a guarantee of stable slopes. Our observations, findings, and opinions are a means to identify and reduce the inherent risks to the owner.

## **CRITICAL AREAS REPORT**

This Critical Area Report is, in part, based on review of the following documents:

1. Sheet 1 of 1, "Gunshy Manor Post BLA," dated January 19, 2012, prepared by ESM Consulting Engineers.
2. Sheet 1 of 1, "Gunshy Manor Critical Areas Designation Exhibit," dated January 3, 2012, prepared by ESM Consulting Engineers.
3. "Geologic Map of the Redmond Quadrangle, King County, Washington," dated 1988, prepared by J.P. Minard and D.B. Booth, United States Geological Survey (USGS) Miscellaneous Field Studies, Map MF-2016.
4. "Geotechnical Assessment Summary," dated September 9, 2009, prepared by Associated Earth Sciences, Inc.

### **Geologic Reconnaissance**

We conducted a reconnaissance of the site on March 8, 2012. During our reconnaissance, no evidence of historical landslide activity, such as scarps, hummocky topography, tension cracks, reversed slope benches, or unusually distorted trees, was observed on the slopes east of the proposed building sites. In addition, no areas of emergent seepage were observed on the slopes east of the proposed building sites on Lots 2, 3, and 5.

### **Geologic Map Review**

Review of the regional geologic map referenced above indicates that the slopes located on the east side of the Evans Creek drainage are underlain by pre-Fraser, non-glacial Olympia beds and Vashon-aged advance outwash. The Olympia beds typically consist of oxidized fine to coarse sand with scattered silt and clay beds and the Vashon advance outwash typically consists of clean, gray to oxidized sand with some gravel. Laminated, gray silt and clay commonly referred to as Lawton silt or Transitional beds may occur between the Olympia beds and the Vashon advance outwash. Due to their compaction by the massive weight of the glacial ice during the Vashon Stage of the Fraser Glaciation, these soils typically exhibit a high relative density when present in its unweathered, undisturbed state. In the area of concern, the geologic map does not show the presence of recent landslide deposits.

According to the geologic map, the less steep areas at the base of the slope are mantled and underlain by younger recessional outwash deposits. These soils typically consist of sand and gravel.

## **Subsurface Exploration**

During a previous assessment of the site, as described in AESI's September 2009 report, we observed soil conditions as exposed in 17 exploration pits completed across the site at the approximate locations shown on Figure 4. Copies of the logs are presented in Appendix A.

Sediments encountered in the exploration pits located in the vicinity of the building sites on Lots 2, 3, and 5 generally consisted of interbedded, medium dense, tan, silty sand, sand and gravel with scattered interbeds of silt. In our opinion, these sediments are consistent with recessional outwash and/or ice contact deposits. At some locations, a thin layer of colluvium (silty, fine to medium sand with scattered organics) overlies the recessional outwash. The soils encountered in the explorations are generally consistent with those identified on the geologic map.

The explorations did not encounter seepage and a persistent, shallow ground water table was not encountered within the exploration pits.

## **Geologic Hazard Areas**

### Landslide Hazard Areas

Section 21A.06.680 of the KCC identifies Landslide Hazard Areas as the following: 1) an area with a combination of slopes steeper than 15 percent, impermeable soils, such as silt and clay, frequently interbedded with granular soils, such as sand and gravel, and springs or ground water seepage; 2) an area that has shown movement during the Holocene epoch (past 10,000 years) or an area underlain by mass wastage debris from that epoch; 3) any area potentially unstable as a result of rapid stream incision, stream bank erosion, or undercutting by wave action; 4) an area that shows evidence of or is at risk from snow avalanches or; 5) an area located on an alluvial fan, presently or potentially subject to inundation by debris flows or deposition of stream-transported sediments.

The inclinations of the slopes on the eastern portions of Lots 2, 3, and 5, east of the proposed building sites, range from about 40 to 58 percent. Slopes west of the toe of the steep slopes and on the east portion of the proposed building sites are inclined at less than 20 percent. Slopes on the south end of Lot 5 are shown on the geologic map as having landslide deposits.

Based on the KCC criteria and existing site conditions, areas of the site at the south end of Lot 5 are classified as Landslide Hazard Areas. The locations of the Landslide Hazard Areas are shown on Figure 3.

### Erosion Hazard Areas

Section 21A.06.415 of the KCC defines Erosion Hazard Areas as an area underlain by soils identified by the U.S. Department of Agriculture Soil Conservation Service (SCS) as having 'severe' or 'very severe' erosion hazards. This includes, but is not limited to, the following group of soils when they occur on slopes of 15 percent or greater:

1. Alderwood gravelly sandy loam (AgD)
2. Alderwood and Kitsap soils (AkF)
3. Beausite gravelly sandy loam (BeD and BeF)
4. Kitsap silt loam (KpD)
5. Ovall gravelly loam (OvD and OvF)
6. Ragnar fine sandy loam (RaD), and
7. Ragnar-Indianola Association (RdE)

Review of the SCS (now known as the Natural Resources Conservation Service) on-line soil mapping for the project area indicates that the steep slopes on the east side of Lots 2, 3, and 5 are mapped as Alderwood and Kitsap soils (AkF), which would classify this area as an Erosion Hazard Area under the KCC. All of the steep slopes on the east side of Lots 2, 3, and 5 are classified as Erosion Hazard Areas and are identified on Figure 3. The area west of the toe of the steep slopes and underlying the proposed building lots is mapped as being Everett gravelly sandy loam (EvC) 5 to 15 percent slopes with a slight to moderate erosion hazard.

### Steep Slope Hazard Areas

Section 21A.06.1230 defines Steep Slope Hazard Areas as an area on a slope of 40 percent inclination or more within a vertical elevation change of at least 10 feet. Inclinations of the steep slopes on the east parts of Lots 2, 3, and 5 range from 40 to 58 percent and are classified as Steep Slope Hazard Areas and are shown on Figure 3.

### **Proposed Building Site**

The proposed building sites for Lots 2, 3, and 5 are shown on Figure 4. The steep slopes east of the proposed building lots are classified as Steep Slope and Erosion Hazard Areas.

### **Recommended Minimum Steep Slope Buffer**

The proposed building sites for Lots 2, 3, and 5 are located just west of the identified Steep Slope Hazard Area for the subject property. Based on the lack of historic landsliding activity



and ground water seepage on these slopes and the compact, high strength nature of the soils underlying the slopes, we recommend a buffer setback of 30 feet from the toe of the Steep Slope Hazard Area. A minimum building setback from the edge of the buffer is not required, in our opinion, because the buffer areas have previously been altered as pasture land for past livestock grazing.

### **Recommended Mitigation for Erosion Hazards**

As of October 1, 2008, the Washington State Department of Ecology (Ecology) Construction Storm Water General Permit (also known as the National Pollutant Discharge Elimination System [NPDES] permit) requires weekly Temporary Erosion and Sedimentation Control (TESC) inspections and turbidity monitoring for all sites 1 or more acres in size that discharge storm water to surface waters of the state. Because we anticipate that the proposed project will require disturbance of more than 1 acre, we anticipate that these inspection and reporting requirements will be triggered. The following recommendations are related to general erosion potential and mitigation.

The most effective erosion control measure is the maintenance of adequate ground cover. Maintaining cover measures atop disturbed ground provides the greatest reduction to the potential generation of turbid runoff and sediment transport. During the local wet season (October 1 through March 31), exposed soil should not remain uncovered for more than 2 days unless it is actively being worked. Ground-cover measures can include erosion control matting, plastic sheeting, straw mulch, crushed rock or recycled concrete, or mature hydroseed.

Some fine-grained surface soils are the result of natural weathering processes that have broken down parent materials into their mineral components. These mineral components can have an inherent electrical charge. Electrically charged mineral fines attract oppositely charged particles and can combine (flocculate) to form larger particles that settle out of suspension. The sediments produced during the recent glaciation of Puget Sound are, however, most commonly the suspended soils that are carried by site storm water. The fine-grained fraction of the glacially derived soil is referred to as "rock flour," which is primarily a silt-sized particle with no electrical charge. These particles have low flocculation characteristics and may have settling times in periods of months.

Therefore, the flow length within a temporary sediment control trap or pond has virtually no effect on the water quality of the discharge, since silt will not settle out of suspension in the time it takes to flow from one end of the pond to the other. Reduction of turbidity from a construction site is almost entirely a function of cover measures and flow control. Temporary sediment traps and ponds are necessary to control the release rate of the runoff and to provide

a catchment for sand-sized and larger soil particles, but are ineffective at reducing the turbidity of the runoff.

To mitigate the erosion hazards and potential for off-site sediment transport, we recommend the following:

1. The winter performance of a site is dependent on a well-conceived plan for control of site erosion and storm water runoff. It is easier to keep the soil on the ground than to remove it from storm water. The owner and the design team should include adequate ground-cover measures, access roads, and staging areas in the project bid to give the selected contractor a workable site. The selected contractor needs to be prepared to implement and maintain the required measures to reduce the amount of exposed ground. A site maintenance (TESC) plan should be in place in the event storm water turbidity measurements are greater than the Ecology standards.
2. All TESC measures for a given area to be graded or otherwise worked should be installed prior to any activity within that area. The recommended sequence of construction within a given area would be to install sediment traps and/or ponds and establish perimeter flow control prior to starting mass grading.
3. During the wetter months of the year, or when large storm events are predicted during the summer months, each work area should be stabilized so that if showers occur, the work area can receive the rainfall without excessive erosion or sediment transport. The required measures for an area to be "buttoned-up" will depend on the time of year and the duration the area will be left un-worked. During the winter months, areas that are to be left un-worked for more than 2 days should be mulched or covered with plastic. During the summer months, stabilization will usually consist of seal-rolling the subgrade. Such measures will aid in the contractor's ability to get back into a work area after a storm event. The stabilization process also includes establishing temporary storm water conveyance channels through work areas to route runoff to the approved treatment facilities.
4. All disturbed areas should be revegetated as soon as possible. If it is outside of the growing season, the disturbed areas should be covered with mulch, as recommended in the erosion control plan. Straw mulch provides the most cost-effective cover measure and can be made wind-resistant with the application of a tackifier after it is placed.

5. Surface runoff and discharge should be controlled during and following development. Uncontrolled discharge may promote erosion and sediment transport. Under no circumstances should concentrated discharges be allowed to flow over significant slopes.
6. Soils that are to be reused around the site should be stored in such a manner as to reduce erosion from the stockpile. Protective measures may include, but are not limited to, covering with plastic sheeting, the use of low stockpiles in flat areas, or the use of straw bales/silt fences around pile perimeters. During the period between October 1 and March 31, these measures are required.
7. On-site erosion control inspections and turbidity monitoring should be performed in accordance with Ecology requirements. Weekly and monthly reporting to Ecology should be performed on a regularly scheduled basis. Temporary and permanent erosion control and drainage measures should be adjusted and maintained, as necessary, at the time of construction.

It is our opinion that with the proper implementation of the TESC plans and by field-adjusting appropriate mitigation elements (best management practices) during construction, as recommended by the erosion control inspector, the potential adverse impacts from erosion hazards on the project may be mitigated.

The conclusions and recommendations presented in this report are based, in part, on the conditions encountered in the explorations completed for this study, and as shown on the referenced geologic map. Because of the nature of exploratory work below ground, extrapolation of subsurface conditions beyond the field explorations is necessary. Differing subsurface conditions may be present outside of the area of the field explorations due to the random nature of deposition and the alteration of topography by past grading and/or filling. The nature and extent of any variations between the field explorations may not become fully evident until construction. We recommend that monitoring of subsurface conditions be conducted periodically by AESI at the time of construction. If variations are observed at that time, it may be necessary to re-evaluate specific recommendations in this report and make appropriate changes.

## CLOSURE

We have enjoyed working with you on this study and are confident that these recommendations will aid in the successful completion of your project. Should you have any questions, or require further assistance, please do not hesitate to call.

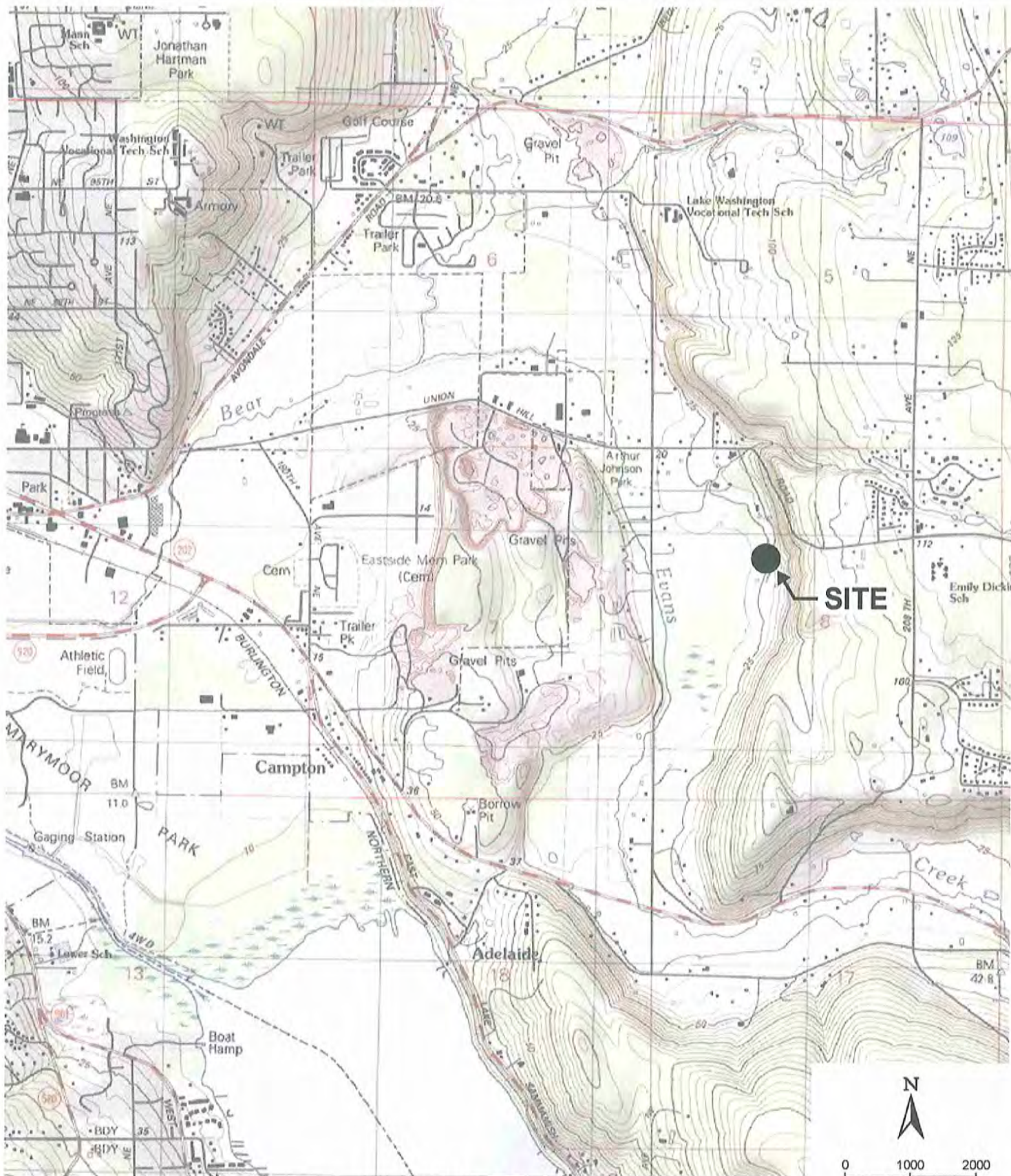
Sincerely,  
**ASSOCIATED EARTH SCIENCES, INC.**  
Kirkland, Washington



Jon N. Sondergaard, L.G., L.E.G.  
Principal Engineering Geologist

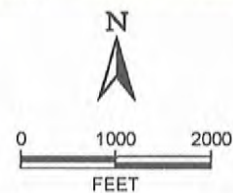
Attachments:	Figure 1:	Vicinity Map
	Figure 2:	Site Plan
	Figure 3:	Critical Areas Map
	Figure 4:	Location of Proposed Building Sites
	Appendix A:	Exploration Logs





REFERENCE: USGS TOPOI

NOTE: BLACK AND WHITE REPRODUCTION OF THIS COLOR ORIGINAL MAY REDUCE ITS EFFECTIVENESS AND LEAD TO INCORRECT INTERPRETATION.



Associated Earth Sciences, Inc.



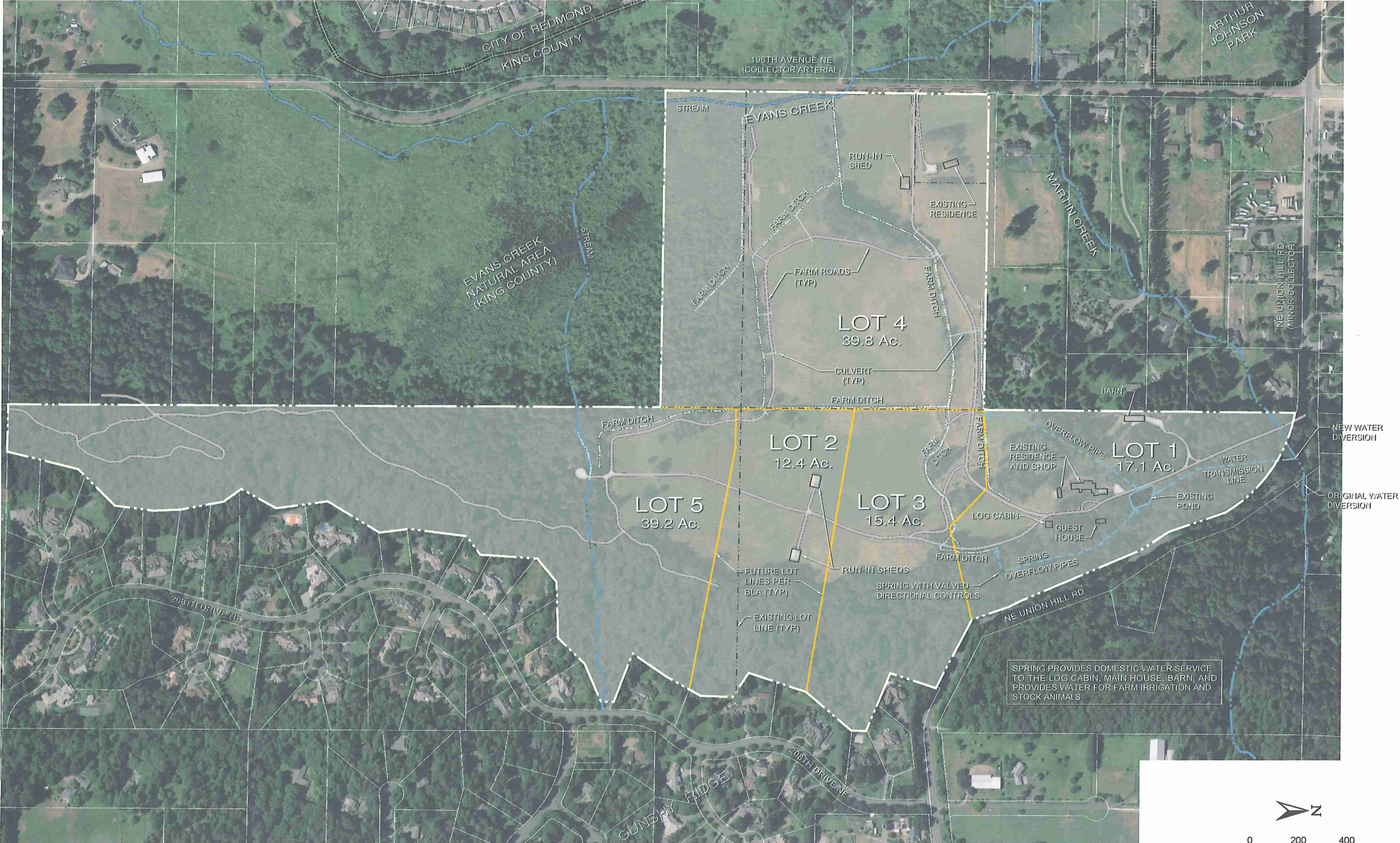
VICINITY MAP  
GUNSHY MANOR  
REDMOND, WASHINGTON

FIGURE 1

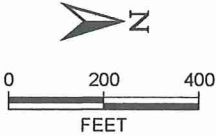
DATE 3/12

ESTATE 00277 PROJ. NO. KE090291B





NOTE: BLACK AND WHITE REPRODUCTION OF THIS COLOR ORIGINAL MAY  
REDUCE ITS EFFECTIVENESS AND LEAD TO INCORRECT INTERPRETATION.



REFERENCE: ESM

Associated Earth Sciences, Inc.



SITE PLAN  
GUNSHY MANOR  
REDMOND, WASHINGTON

FIGURE 2  
DATE 3/12

ESTATE 00278





REFERENCE: ESM

Associated Earth Sciences, Inc.



CRITICAL AREAS MAP - GEOLOGIC HAZARD AREAS  
GUNSHY MANOR  
REDMOND, WASHINGTON

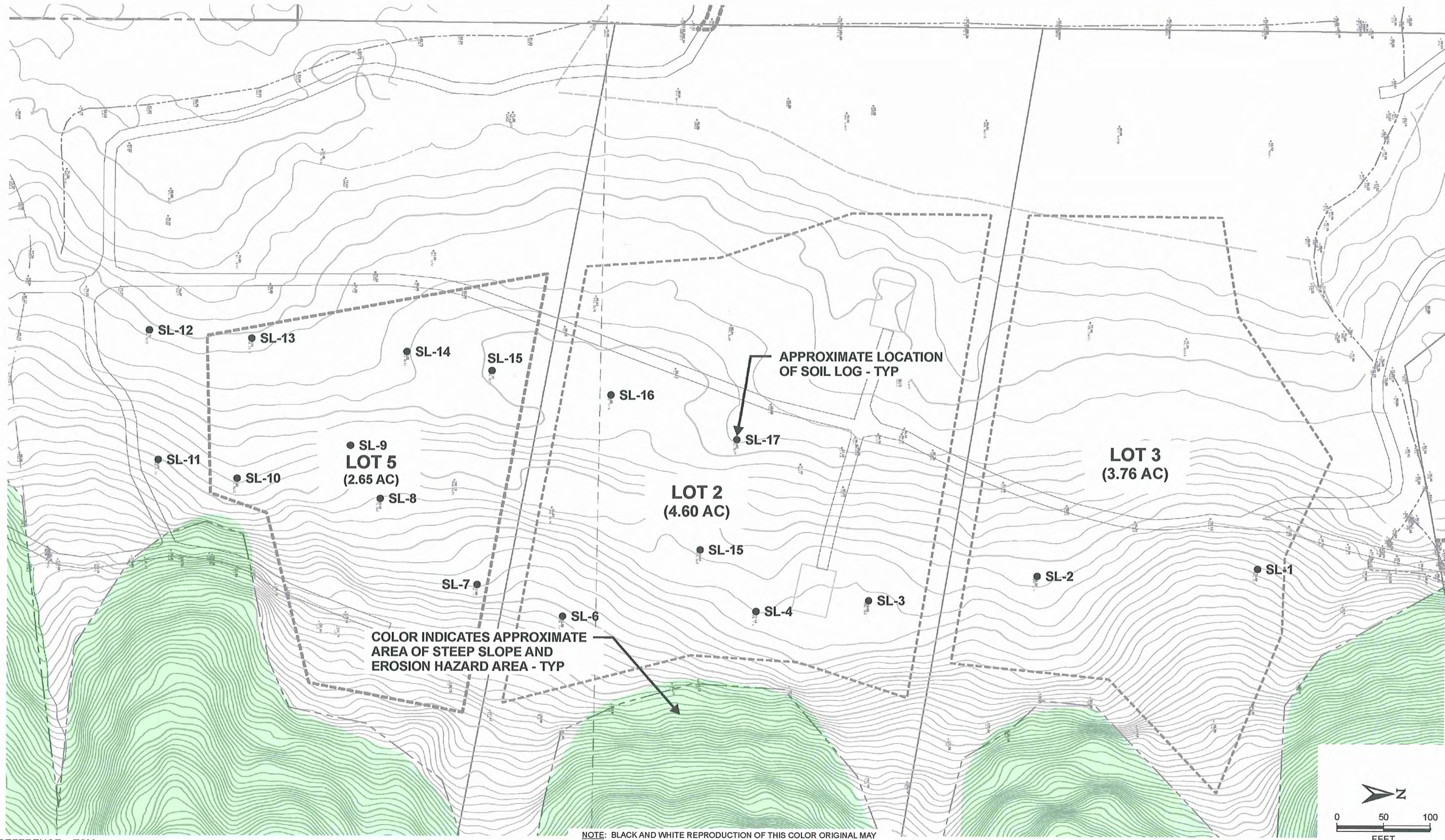
FIGURE 3

DATE 3/12

PROJ. NO. KE090291B  
ESTATE 00279



090291 Gunshy Manor 090291 Prop Sites.cdr



REFERENCE: ESM

Associated Earth Sciences, Inc.



PROPOSED BUILDING SITES  
GUNSHY MANOR  
REDMOND, WASHINGTON

FIGURE 4

DATE 3/12

PROJ NO KE090291B  
**ESTATE 00280**



# **APPENDIX A**

## **Exploration Logs**

blocks\log key.dwg LAYOUT: Layout2

Associated Earth Sciences, Inc.



## FIGURE A1

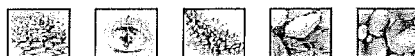
~~ESTATE 00282~~

# LOG OF EXPLORATION PIT NO. SL-1

Depth (ft)	<p>This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.</p> <p><b>DESCRIPTION</b></p>	
	<b>Sod and Topsoil</b>	
	<b>Recessional Outwash</b>	
1	Medium dense, damp, tan, weakly stratified, sandy fine to coarse subrounded GRAVEL, few subrounded cobbles, few grading to trace silt with depth (GW).	
2		
3		
4		
5		
6		
7	Bottom of exploration pit at 6 feet. No caving. No ground water seepage observed.	
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

## Geotechnical Assessment King County, WA

Associated Earth Sciences, Inc.



Logged by: JDC

Approved by:

Project No. KE090291A

ESTATE 00283 8/6/09

## LOG OF EXPLORATION PIT NO. SL-2

Depth (ft)	DESCRIPTION
1	<p>This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.</p> <p style="text-align: center;"><b>Topsoil/Sod</b></p> <p style="text-align: center;"><b>Ice-Contact Deposit</b></p> <p>Dense, damp, tan, silty gravelly SAND.</p>
2	-----
3	<p style="text-align: center;"><b>Ice-Contact Deposit</b></p> <p>Very dense, tan to gray, slightly mottled, fine sandy SILT, with scattered gravel.</p>
4	
5	<p>Bottom of exploration pit at 3.8 feet.</p> <p>No water.</p>
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

### Geotechnical Assessment King County, WA

Associated Earth Sciences, Inc.



Logged by: JNS

Approved by:

Project No. KE090291A

**ESTATE 00284** 8/5/09

## LOG OF EXPLORATION PIT NO. SL-3

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.
	DESCRIPTION
	Topsoil/Sod
1	Ice-Contact Deposit
	Dense, damp, tan, silty gravelly SAND.
2	
3	
	Ice-Contact Deposit
4	Very dense, moist, brown, fine sandy SILT, with gravel and scattered cobbles.
5	
6	
7	Bottom of exploration pit at 6.2 feet. No water.
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

### Geotechnical Assessment King County, WA

Associated Earth Sciences, Inc.



Logged by: JNS

Approved by:

Project No. KE090291A

**ESTATE 00285** 8/5/09

## LOG OF EXPLORATION PIT NO. SL-4

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.
	DESCRIPTION
	Topsoil/Sod
1	Ice-Contact Deposit
	Dense, damp to moist, mottled silty fine SAND, with scattered organics.
2	
	Ice-Contact Deposit
3	
	Very dense, moist, brown to gray, silty fine SAND.
4	
5	
6	Bottom of exploration pit at 5.3 feet. No water.
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

### Geotechnical Assessment King County, WA

Associated Earth Sciences, Inc.



Logged by: JNS

Approved by:

Project No. KE090291A

**ESTATE 00286 8/5/09**

## LOG OF EXPLORATION PIT NO. SL-5

Depth (ft)	DESCRIPTION
1	<b>Sod and Topsoil</b>
2	<b>Ice-Contact Deposit</b>
3	Dense, damp to moist, tan, non-stratified, silty fine to coarse SAND, trace to few fine to coarse, subrounded gravel (SM).
4	
5	Bottom of exploration pit at 4.5 feet. No caving. No ground water observed.
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

### Geotechnical Assessment King County, WA

Associated Earth Sciences, Inc.



Logged by: JDC

Approved by:

Project No. KE090291A

**ESTATE 00287** 8/6/09

# LOG OF EXPLORATION PIT NO. SL-6

Depth (ft)	<p>This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.</p> <p><b>DESCRIPTION</b></p>	
	<b>Topsoil/Sod</b>	
1	<b>Ice-Contact Deposit</b>	
	Medium dense to dense, damp, tan, silty fine SAND, with gravel.	
2	<b>Ice-Contact Deposit</b>	
	Dense, damp to moist, gray to brown, slightly mottled, sandy GRAVEL.	
3	<b>Ice-Contact Deposit</b>	
	Dense, moist, gray to brown, silty SAND, with gravel.	
4		
5		
6	Bottom of exploration pit at 5 feet. No water.	
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

## Geotechnical Assessment King County, WA

Associated Earth Sciences, Inc.



Logged by: JNS

Approved by:

Project No. KE090291A

ESTATE 00288 8/5/09



# LOG OF EXPLORATION PIT NO. SL-7

Depth (ft)	<p>This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.</p> <p><b>DESCRIPTION</b></p>	
	<b>Topsoil/Sod</b>	
1	Medium dense, damp, brown, silty SAND, with some gravel and numerous rootlets.	
	<b>Colluvium</b>	
2	Medium dense to dense, moist, mottled rusty brown to brown, silty fine SAND, with rotten logs (6") and organic pods in the upper 1'.	
3		
	<b>Ice-Contact Deposit</b>	
4	Dense, moist, gray to brown, silty SAND, with gravel, becoming wet at 4.9'.	
5		
6	Bottom of exploration pit at 4.9 feet. No water.	
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

## Geotechnical Assessment King County, WA

Associated Earth Sciences, Inc.



Logged by: JNS

Approved by:

Project No. KE090291A

ESTATE 00289 8/5/09

## LOG OF EXPLORATION PIT NO. SL-8

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.
	DESCRIPTION
	Sod and Topsoil
1	<b>Ice-Contact Deposit</b>
2	Medium dense to dense, damp, tan grading to light brown with depth, weakly stratified, silty fine to coarse SAND, trace fine subrounded gravel (some thin sandy silt lenses in the upper 1')
3	(SM/ML/SM).
4	
5	Bottom of exploration pit at 4 feet. No caving. No ground water observed.
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

### Geotechnical Assessment King County, WA

Associated Earth Sciences, Inc.



Logged by: JDC

Approved by:

Project No. KE090291A

**ESTATE 00290** 8/6/09

## LOG OF EXPLORATION PIT NO. SL-10

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.
	<b>DESCRIPTION</b>
	<b>Topsoil/Sod</b>
1	<b>Ice-Contact Deposit</b>
	Medium dense to dense, damp to moist, orange-brown, silty SAND, with gravel.
2	
3	<b>Ice-Contact Deposit</b>
4	Dense, moist, gray-brown, fine sandy SILT to silty fine SAND, with scattered gravel.
5	Bottom of exploration pit at 4.3 feet. No water.
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

### Geotechnical Assessment King County, WA

Associated Earth Sciences, Inc.



Logged by: JNS

Approved by:

Project No. KE090291A

**ESTATE 00291** 8/5/09

# LOG OF EXPLORATION PIT NO. SL-11

Depth (ft)	<p>This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.</p> <p><b>DESCRIPTION</b></p>	
	<b>Topsoil/Sod</b>	
	<b>Colluvium</b>	
1	Dense, damp to moist, oxidized brown to brown, gravelly SAND, with silt.	
2	1" charcoal layer at 2'.	
3		
4		
	<b>Ice-Contact Deposit</b>	
5	Dense, moist, gray, silty fine SAND, with gravel.	
6	Bottom of exploration pit at 4.3 feet. No water.	
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

## Geotechnical Assessment King County, WA

Associated Earth Sciences, Inc.



Logged by: JNS

Approved by:

Project No. KE090291A

**ESTATE 00292** 8/5/09

# LOG OF EXPLORATION PIT NO. SL-12

Depth (ft)	<p>This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.</p> <p><b>DESCRIPTION</b></p>	
	<b>Topsoil/Sod</b>	
	<b>Recessional Outwash</b>	
1	Medium dense to dense, damp, brown, sandy GRAVEL, with few silt.	
2		
3	-----	
	<b>Ice-Contact Deposit</b>	
4	Dense, moist, mottled rusty brown to gray, fine sandy SILT, with some gravel.	
5		
6	Bottom of exploration pit at 4.5 feet. No water.	
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

## Geotechnical Assessment King County, WA

Associated Earth Sciences, Inc.



Logged by: JNS

Approved by:

Project No. KE090291A

**ESTATE 00293** 8/5/09

# LOG OF EXPLORATION PIT NO. SL-13

Depth (ft)	<p>This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.</p> <p><b>DESCRIPTION</b></p>	
	<p><b>Topsoil/Sod</b></p>	
	<p><b>Colluvium</b></p>	
1	<p>Medium dense to dense, rusty brown to orange, silty fine SAND to fine sandy SILT, and scattered organics.</p>	
2	<p><b>Ice-Contact Deposit</b></p>	
3	<p>Dense, moist, mottled rusty brown to gray, silty SAND, with few gravel. Becomes moist with depth.</p>	
4		
5	<p>Bottom of exploration pit at 4.3 feet. No water.</p>	
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

## Geotechnical Assessment King County, WA

Logged by: JNS

Approved by:

Associated Earth Sciences, Inc.



Project No. KE090291A

**ESTATE 00294** 8/5/09

# LOG OF EXPLORATION PIT NO. SL-14

Depth (ft)	<p>This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.</p> <p><b>DESCRIPTION</b></p>	
	<p><b>Topsoil/Sod</b></p>	
	<p><b>Recessional Outwash</b></p>	
1	<p>Medium dense to dense, dry to damp, tan, silty SAND, with scattered gravel.</p>	
2		
3	<p><b>Ice-Contact Deposit</b></p>	
	<p>Dense, moist, mottled light gray to brown, slightly silty to silty fine SAND.</p>	
4		
5		
6	<p>Bottom of exploration pit at 4.6 feet.</p>	
7	<p>No water.</p>	
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

## Geotechnical Assessment King County, WA

Associated Earth Sciences, Inc.



Logged by: JNS

Approved by:

Project No. KE090291A

**ESTATE 00295** 8/5/09

# LOG OF EXPLORATION PIT NO. SL-15

Depth (ft)	<p>This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.</p> <p><b>DESCRIPTION</b></p>	
	<p><b>Topsoil/Sod</b></p>	
1	<p><b>Colluvium</b></p>	
2	<p>Medium dense to dense, damp to moist, tan to rusty brown, silty SAND, with gravel and scattered organics (charcoal).</p>	
3	<p><b>Ice-Contact Deposit</b></p>	
4	<p>Dense, moist, tan to light gray, fine sandy SILT, with scattered gravel.</p>	
5		
6	<p>Bottom of exploration pit at 4.4 feet. No water.</p>	
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

## Geotechnical Assessment King County, WA

Associated Earth Sciences, Inc.



Logged by: JNS

Approved by:

Project No. KE090291A

**ESTATE 00296** 8/5/09



# LOG OF EXPLORATION PIT NO. SL-16

Depth (ft)	<p>This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.</p> <p><b>DESCRIPTION</b></p>	
	<b>Topsoil/Sod</b>	
1	<b>Recessional Outwash</b> Medium dense to dense, damp, tan, silty SAND, with gravel.	
2		
	<b>Ice-Contact Deposit</b>	
3	Dense, moist, gray, slightly mottled tan to gray, silty fine SAND, with thin irregular interbeds of fine	
4	to medium sand and scattered gravel.	
5		
6	Bottom of exploration pit at 4.6 feet. No water.	
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

## Geotechnical Assessment King County, WA

Logged by: JNS

Approved by:

Associated Earth Sciences, Inc.



Project No. KE090291A

**ESTATE 00297** 8/5/09

# LOG OF EXPLORATION PIT NO. SL-17

Depth (ft)	<p>This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplification of actual conditions encountered.</p> <p><b>DESCRIPTION</b></p>	
	<b>Topsoil/Sod</b>	
1	<b>Recessional Outwash</b> Medium dense to dense, damp, tan, silty SAND, with scattered gravel.	
2	----- <b>Ice-Contact Deposit</b>	
3	Dense, moist, slightly mottled rusty brown to gray, slight silty to silty fine SAND, with scattered gravel.	
4		
5		
6	Bottom of exploration pit at 5.3 feet. No water. Several tree roots at 2' to 3'.	
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

## Geotechnical Assessment King County, WA

Logged by: JNS

Approved by:

Associated Earth Sciences, Inc.



Project No. KE090291A

**ESTATE 00298**

8/5/09